

# A Quantitative Analysis of the Effectiveness of a Field Visit on the Environmental Knowledge, Attitudes, and Behavior of Youth

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Young people are becoming more detached from nature through a number of causes, including their increased use of digital media. This detachment from nature results in a lowering in the sense of ownership of the land and its resources, and subsequently, results in less motivation to conserve it. In order to reverse such behaviours and attitudes, a new programme termed “Lifelong Learning through Nature (LLN)” was devised. This study is an analysis of the LLN programme and its potential of making links among outdoor learning, fieldwork, and education for sustainable development. These results shed light on the effectiveness of the programme in influencing knowledge and attitudes, and in turn, lead to formulate a way forward in the programme’s evolution. Outdoor education is an essential element of education for sustainable development (ESD), which is key to address the current situation for a sustainable future. The data is collected through an extended questionnaire from a number of different schools in the Maltese islands, which is analysed through Statistic Package for Social Science (SPSS). The results reveal a great sense of detachment in the young students, and eventually, a greater sense of pointlessness in the older students. This study reveals that the field visit does have an influential role in the knowledge and attitudes of school children towards nature. This study continues to uphold the vision that outdoor education should be considered as a main activity, which involves and results in ESD. In response to these findings, a model illustrating the emerging links between the field visit programme and various factors is presented. This paper directly illustrates how university research in teamwork with non-governmental organisations can impact the local community. Also, the study will be useful to anyone who is interested in carrying out effective programs and research in the links between ESD and outdoor education.

*Keywords:* field visit, education for sustainable development (ESD), quantitative methods, outdoor education

## Introduction

This research was developed in order to study the effectiveness and analyse the fieldwork component of the a collaborative educational programme termed “Lifelong Learning through Nature (LLN),” which is partnership project among BirdLife Malta, the Ministry for Education and Employment (Malta), the Royal Society for the Protection of Birds (UK), BirdWatch Ireland, and the Polish Society for the Protection of Birds.

The study included the following main objectives:

1. To analyse the current perceptions of youth with regard to the environment;
2. To study the effectiveness of the resources produced by the programme;

3. To study the effectiveness of the LLN programme in moulding current youth perceptions;
4. To study whether the programme has an impact on student understanding or not;
5. To study possible links to an increased connection between “nature and health” and “well-being and education”;
6. To use the feedback in an ongoing way to improve the delivery and effectiveness of the programme.

The fieldwork programme is a new environmental education programme being piloted by BirdLife Malta. A study on such a programme that the young students and teachers are involved will be of benefit to the environment in this particular geographic location. Additionally, not much is known about the perceptions of young people in the Maltese islands. Although published research (Mifsud, 2011) indicated and highlighted a number of main processes that are responsible for the acquisition and development of environmental perspectives in young people in Malta, including outdoor education. These processes can foster a sense of environmental responsibility, but action towards sustainable development in a small island state still need to be investigated.

### **Youth and Environmental Perceptions**

The perception of environmental issues, as represented by the environmental actions, attitude, and knowledge of young people is of great importance for a number of reasons as the following:

1. Knowing what students think about environmental issues will help to establish better pro-environmental education among them (Pawlowski, 1996);
2. The involvement of youth in environment and development decision-making and in the implementation of programmes is critical to the long-term success of Agenda 21\* (United Nations Conference on Environment and Development [UNCED], 1992);
3. In the near future, they will have a great influence on the running of business (Bynoe, 2005);
4. College students are an important segment of society and warrant attention in terms of studying environmental attitudes, as they have been the leading crusaders in the modern environmental movement. For example, the huge success of Earth Day (1970) in the USA was largely attributed to college students when approximately 1,500 colleges participated in the campaign (Thapa, 2001);
5. As most environmental attitude studies focus on adults, Gough (1999) stressed the need for studies of environmental sensitivity in youth and stated that working with young people who have chosen to be environmental activists/educators is much more meaningful for replicability of significant life experiences than working with old people;
6. Education for sustainable development (ESD) is now specifically mentioned in the National Curriculum Framework (NCF) as a cross curricular theme and teachers will be given the opportunity to introduce ESD concepts in each lesson. This is crucial in order to put ESD on top of its national agenda as proposed during the United Nations (UN) Decade of ESD in 2005-2014.

### **Overarching Research Framework**

This research moves beyond the quantitative/qualitative debate as both types of research are useful. The aim of the methodology in this research is to maximize the strength of the traditional qualitative and

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\* Agenda 21 is a non-binding action plan of the United Nations with regard to sustainable development.

quantitative methods, and minimize their weaknesses. Mixed methods is therefore an ecotone in between two ecosystems. It is the grey area in between the black and white continuum.

The methodology for this study included a mixed method approach employing a combination of empirical/analytical and constructivist/interpretivists approaches. This complementary research activity promotes a multi-paradigm research, in which each methodological approach can contribute in meeting valid research goals of environmental education (Connell, 1997). Nonetheless, the quantitative study only is considered within the parameters of this paper.

The quantitative data was collected through the use of a number of questionnaires, which were drafted following consultation with existing questionnaires already used in the field (Mifsud, 2012). The questionnaires were piloted, and eventually, the delivery and collection of the questionnaires took place in the first three months of the year 2016. The questionnaires allowed for the collection of a large amount of data from a statistically significant sample of the student population in the Maltese islands. The sample was a stratified random sample and included 329 primary students (166 males and 191 females) and 233 secondary students (147 males and 86 females).

The questionnaire examined a number of different areas as the following:

1. Socio-demographic characteristics;
2. The participants' experience of the LLN programmes;
3. The strengths and weaknesses of the visit;
4. Thoughts, feelings, and perceptions about the nature watch visit;
5. Sources of environmental information and their reliability.

The data was collected, and eventually, inputted into a number of Statistic Package for Social Science (SPSS) spreadsheets. Another questionnaire with open-ended questions was distributed to the teachers who did the nature reserve watch visit with their students. In this case, the sample amounted to all the teachers who were involved bringing the teacher sample to 57. A number of descriptive and inferential statistical tests were conducted.

### **The Analysis**

Quantitative data was collected through three questionnaires and addressed to primary and secondary students. The questionnaires were drafted through the combination of a number of synergistic factors. The questionnaire examined a number of different areas that focused on uncovering the importance or otherwise of the LLN programme. The questionnaire also obtained information on socio-demographic characteristics of youth. The results presented here have been achieved through stratified random sampling, which attempt to portray a statistically significant sample of the young people of the Maltese islands and as such can be extrapolated to the whole population of young people on the islands.

### **Demographics of Participating Young Students**

The sample of the quantitative study consisted of 329 primary students, include 166 males and 191 females (see Table 1), and 233 secondary students, include 147 males and 86 females (see Table 2)

Table 1

*Gender of Primary Students*

Gender	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Boy	166	50.5	50.5	50.5
Girl	163	49.5	49.5	100.0
Total	329	100.0	100.0	100.0

Table 2

*Gender of Secondary Students*

Gender	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Boy	86	36.9	36.9	36.9
Girl	147	63.1	63.1	100.0
Total	233	100.0	100.0	

The age of students varied from the minimum of 7-year-old up to a maximum of 16-year-old. The majority of students had either 7-year-old, 8-year-old, or 14-year-old (see Tables 3 & 4).

Table 3

*Age of Primary Students*

Age	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
7-year-old	121	36.8	36.8	36.8
8-year-old	106	32.2	32.2	69.0
9-year-old	54	16.4	16.4	85.4
10-year-old	32	9.7	9.7	95.1
11-year-old	16	4.9	4.9	100.0
Total	329	100.0	100.0	

Table 4

*Age of Secondary Students*

Age	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
11-year-old	23	9.9	9.9	9.9
12-year-old	29	12.4	12.4	22.3
13-year-old	38	16.3	16.3	38.6
14-year-old	84	36.1	36.1	74.7
15- and 16- year-old	59	25.3	25.3	100.0
Total	233	100.0	100.0	

Malta is traditionally subdivided into three major regions and Gozo, with their particular demographics. The North is thought of as being the region, in which the higher social class and more educated people live. In fact, a town, like Swieqi, in the North of the island has 25% population who achieved a tertiary level of education, while Marsa in the centre has one-sixth of its population, which are still illiterate. Alarming, one in every 20 adolescents aged 10-19 in Bormla and Birgu in the south is illiterate (Government of Malta, 2005).

Nonetheless, lately a large number of people are moving from one region to the other especially as new villages and towns, like Marsascala, in the South are breaking with this tradition. In fact, Marsascala has 19%

population that has attained a post-secondary level of education putting the town in first place in this area (Government of Malta, 2005). Tables 5 and 6 indicate the geographic region, in which participants reside. Due to the schools participating in the study, the primary and secondary samples had a small number of both students residing in the North and Gozo, and 10 secondary students did not answer this question.

Table 5

*Geographic Region of Primary Participants*

Region	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
South	147	44.7	44.7	44.7
Central	146	44.4	44.4	89.1
North	14	4.3	4.3	93.3
Gozo	22	6.7	6.7	100.0
Total	329	100.0	100.0	

Table 6

*Geographic Region of Secondary Participants*

	Region	Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Valid	South	105	45.1	47.1	47.1
	Central	76	32.6	34.1	81.2
	North	18	7.7	8.1	89.2
	Gozo	24	10.3	10.8	100.0
	Total	223	95.7	100.0	
Missing	System	10	4.3		
	Total	233	100.0		

**Experiences in the Nature Watch Reserve Visit**

The main question in both primary and secondary students' questionnaire asked them to rate their experience of the nature watch reserve visit on a 5-point Likert scale. The results were positive in their majority with all the statements achieving a mean rating exceeding 4 on a scale from 1-5 (1 = "Strongly disagree," 2 = "Disagree," 3 = "Not certain," 4 = "Agree," and 5 = "Strongly agree") for primary students and positive but at a slightly lower level for secondary students (see Table 7).

Table 7

*Nature Watch Reserve Visit Experience for Primary Students*

Statements	N	Minimum	Maximum	Mean	Std. deviation
The nature watch reserve visit was interesting	329	3	5	4.75	0.536
I enjoyed the visit	329	1	5	4.76	0.554
The teachers on site were good	329	1	5	4.77	0.560
The materials and handouts were good	329	1	5	4.40	0.891
The place was great	329	2	5	4.74	0.634
I felt safe outside	329	1	5	4.15	1.000
The visit helped me in school subjects	329	1	5	4.38	0.965
I learned a lot in the outing	329	1	5	4.65	0.682
I cared more about nature following the visit	329	1	5	4.59	0.865

Table 8

*Nature Watch Reserve Visit Experience for Secondary Students*

Statements	N		Mean	Std. deviation
	Valid	Missing		
The nature watch reserve visit was interesting	233	0	4.10	0.853
I enjoyed the reserve visit	233	0	3.96	0.911
The teachers on the site were good	233	0	4.24	0.795
The materials and handouts were good	233	0	4.09	0.854
The place was great	233	0	4.10	0.892
I felt safe outside	233	0	4.11	0.974
The visit helped me in school subjects	233	0	3.94	0.963
I learnt a lot in the outing	233	0	4.00	0.931
Group work was good	233	0	3.72	1.041
Individual work was good	233	0	3.77	1.023
I cared more about nature following the visit	233	0	3.95	1.003

**The Best Part of the Programme**

“I increase my knowledge (72.5%)” and “I care about the environment (57.7%)” were mentioned as the most important reasons for taking part in the nature watch reserve visit. The importance of linking the visit to relevant knowledge in the visit is highlighted. Nonetheless, there also appears to be a strong emotional factor that should be addressed in such field visits. Other important reasons that were mentioned include national issues: “I have fun (42.3%),” “To do better in school subjects (39.6%),” and “I love the activities (28.4%).”

The mean of the remaining reasons drops significantly. Especially, thought-provoking are the results for the statements that included some sort of achievement or competition, such as “I like to receive an award” (7.7%). This low response rate seems to indicate that students are more interested in intrinsic motivating factors rather than extrinsic. Programmes can become more effective if this is taken into consideration. Table 9 and Figure 1 illustrate the results obtained from this question.

Analysis of the above data according to gender seems to show that the results are the same for boys and girls for most of the reasons. The main differences between girls and boys appear to be the following two statements: “I have fun (53.1% and 36.2%, respectively)” and “To make more friends (3.7% and 9.2%, respectively).” Boys seem to be more interested in having “fun” than girls, while real social interaction (although low in both genders) is more sought after by girls (see Table 10).

Table 9

*The Best Part of the Programme for Secondary Students*

Statements	Frequency	Percentage (%)
I like to receive an award	17	7.7
I increase my knowledge	161	72.5
Because of my values	16	7.2
To do better in school subjects	88	39.6
I care about the environment	128	57.7
I love the activities	63	28.4
I have fun	94	42.3
To make more friends	16	7.2
To achieve more as a class	41	18.5
To achieve more as a school	32	14.4

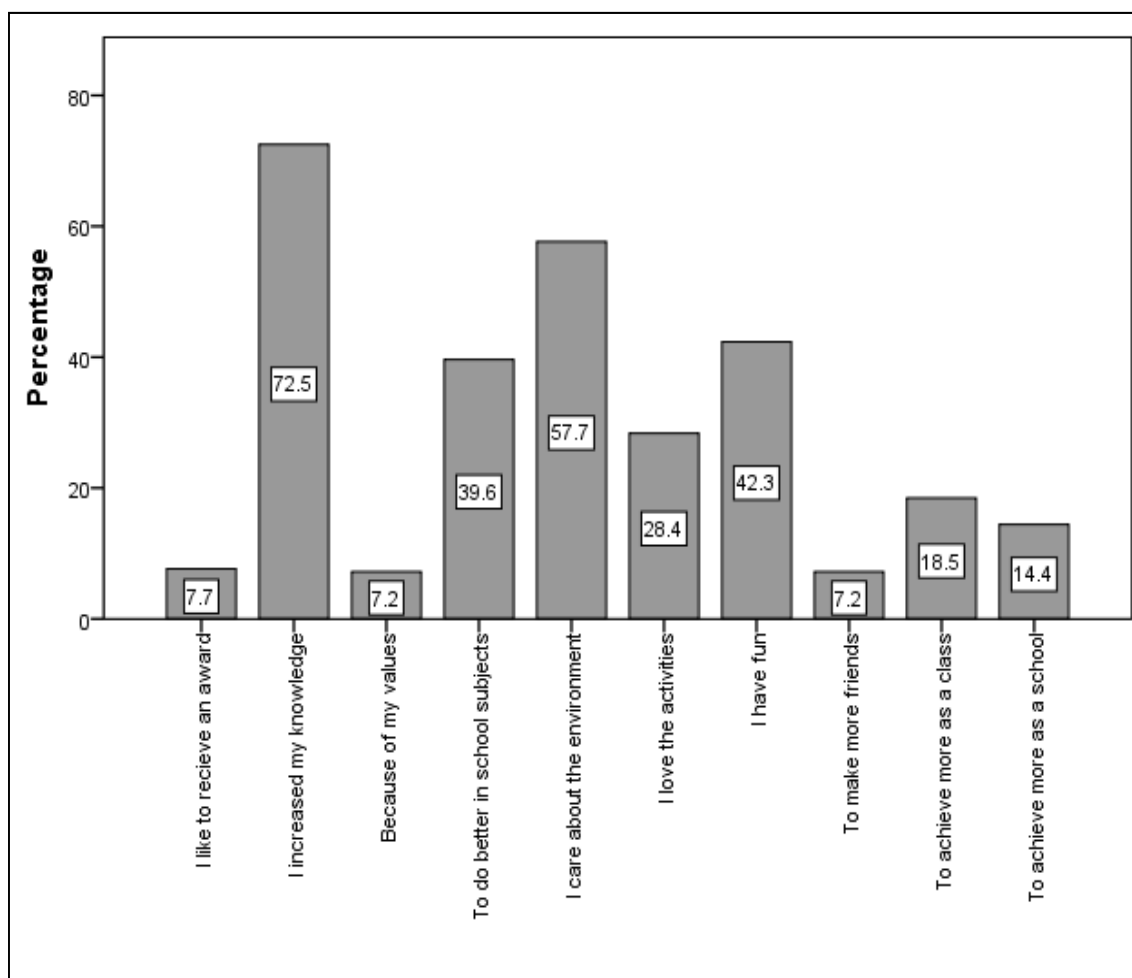


Figure 1. The best part of the programme for secondary students.

Table 10

*The Best Part of the Programme for Secondary Girls/Boys*

Statements	Gender	
	Boy (%)	Girl (%)
I like to receive an award	6.2	8.5
I increase my knowledge	77.8	69.5
Because of my values	6.2	7.8
To do better in school subjects	35.8	41.8
I care about the environment	54.3	59.6
I love the activities	28.4	28.4
I have fun	53.1	36.2
To make more friends	3.7	9.2
To achieve more as a class	11.1	22.7
To achieve more as a school	17.3	12.8

### Sources of Information

The majority of students received some information from all the listed sources. Results show that students receive most information from school (*Mean* = 3.48), the Internet (*Mean* = 3.45), and the LLN nature visit

(*Mean* = 3.36). Conversely, students obtain the least amount of information from radio (*Mean* = 1.77), Billboards (*Mean* = 1.78), and government agencies (*Mean* = 1.94). The general importance of education in this section was strongly emphasised and the importance of the Internet, school, and the LLN nature visit to a holistic increase in environmental awareness should be studied further. The government should start a review process of the effectiveness or otherwise of its agencies as they appear to be largely invisible to the younger generation with regards to environmental issues (see Table 11).

Table 11

*Where do you Get Most Information Regarding the Environment for Secondary Students*

	<i>N</i>		<i>Mean</i>	<i>Std. deviation</i>	<i>Sum</i>
	Valid	Missing			
Billboards	233	0	1.78	0.814	415
Books	233	0	2.91	0.974	677
Family	233	0	2.71	1.012	632
Friends	233	0	2.51	0.947	584
Government agencies	233	0	1.94	0.947	453
Internet	233	0	3.45	0.798	805
Magazines	233	0	2.10	0.967	489
National campaigns	233	0	2.20	1.032	512
Non-governmental organisations	233	0	2.07	1.004	483
Radio	233	0	1.77	0.941	412
School	233	0	3.48	0.726	810
Television	233	0	2.71	1.051	631
Dinja Wahda	233	0	2.20	1.058	513
Ekoskola	233	0	2.39	1.151	556
The nature watch reserve visit	233	0	3.36	0.799	784

### Inferential Statistics

In this study, statistical tests were carried out to evaluate the different parameters of the questionnaire in order to find the degree of interactions, if any. More specifically, a number of correlations were carried out with various types of demographic data.

#### Primary Students

The results from the questions that concerned the nature watch reserve visit experience reveal that the experience was a very positive one and that there are some differences in the results of the various statements. The results for primary students indicate that “The teachers on site were good (*Mean* = 4.77)” and “I enjoyed the visit (*Mean* = 4.76)” were the top scoring statements, while “I felt safe outside (*Mean* = 4.15)” was the lowest scoring statement. The Friedman test suggests that the difference in statement score is significant and is not attributed to chance since the *p*-value (approximately 0.001) is less than the 0.05 level of significance (see Table 12 and Figure 2).

The mean score from the nature watch reserve visit experience was analyzed according to the gender of the young people population to identify any correlation between the two. The mean total scores for females and males appear to be both very positive in all the statements. Further analysis with the Kruskal Wallis test indicates that for most of the statements there is no statistical significance between genders. However, the test



indicates statistical significance for two statements: “I enjoyed the visit” and “The place was great” since the  $p$ -value (approximately 0.036 and 0.030, respectively) is less than the 0.05 level of significance. Therefore, the statistical test indicates a statistically significant relationship between gender and these two statements, suggesting that males enjoyed the visit and the place more than females (see Table 13 and Figure 3).

Table 12

*Nature Watch Reserve Visit Experience*

Experience of nature watch reserve visit	Mean	Std. deviation	Minimum	Maximum
The nature watch reserve visit was interesting	4.75	0.536	3	5
I enjoyed the visit	4.76	0.554	1	5
The teachers on site were good	4.77	0.560	1	5
The materials and handouts were good	4.40	0.891	1	5
The place was great	4.74	0.634	2	5
I felt safe outside	4.15	1.000	1	5
The visit helped me in school subjects	4.38	0.965	1	5
I learned a lot in the outing	4.65	0.682	1	5
I care more about nature following the visit	4.59	0.865	1	5

Notes.  $\chi^2(8) = 294.74$ ;  $p < 0.001$ .

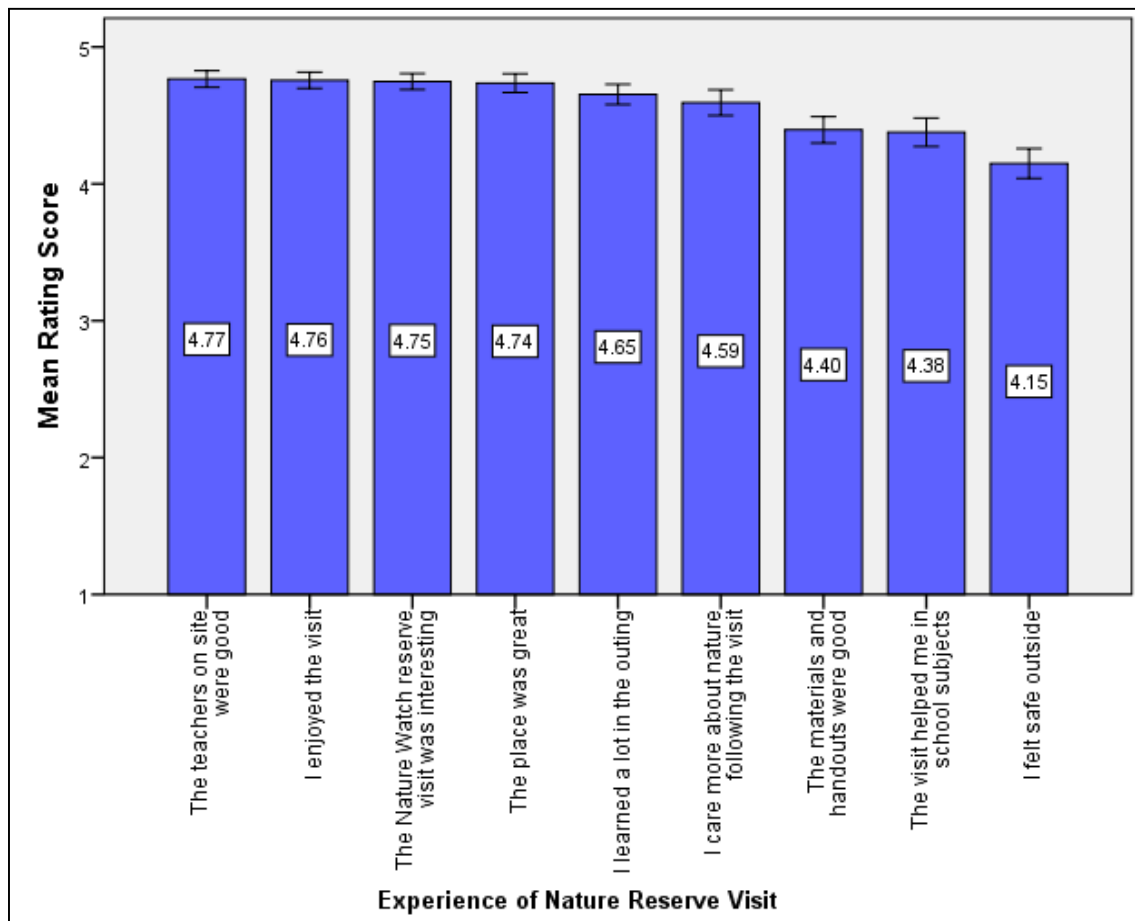


Figure 2. Experience of nature watch reserve visit.

Table 13

*Nature Watch Reserve Visit Experience in Male/Female Comparison*

Experience of nature watch reserve visit	Gender	Mean	Std. deviation	p-value
The nature watch reserve visit was interesting	Boy	4.78	0.529	0.087
	Girl	4.71	0.541	
I enjoyed the visit	Boy	4.80	0.578	0.036
	Girl	4.72	0.527	
The teachers on site were good	Boy	4.75	0.579	0.514
	Girl	4.79	0.541	
The materials and handouts were good	Boy	4.39	0.951	0.814
	Girl	4.40	0.829	
The place was great	Boy	4.81	0.527	0.030
	Girl	4.66	0.722	
I felt safe outside	Boy	4.19	1.026	0.233
	Girl	4.10	0.973	
The visit helped me in school subjects	Boy	4.40	0.972	0.520
	Girl	4.36	0.960	
I learned a lot in the outing	Boy	4.67	0.698	0.383
	Girl	4.63	0.666	
I care more about nature following the visit	Boy	4.50	0.971	0.069
	Girl	4.69	0.733	

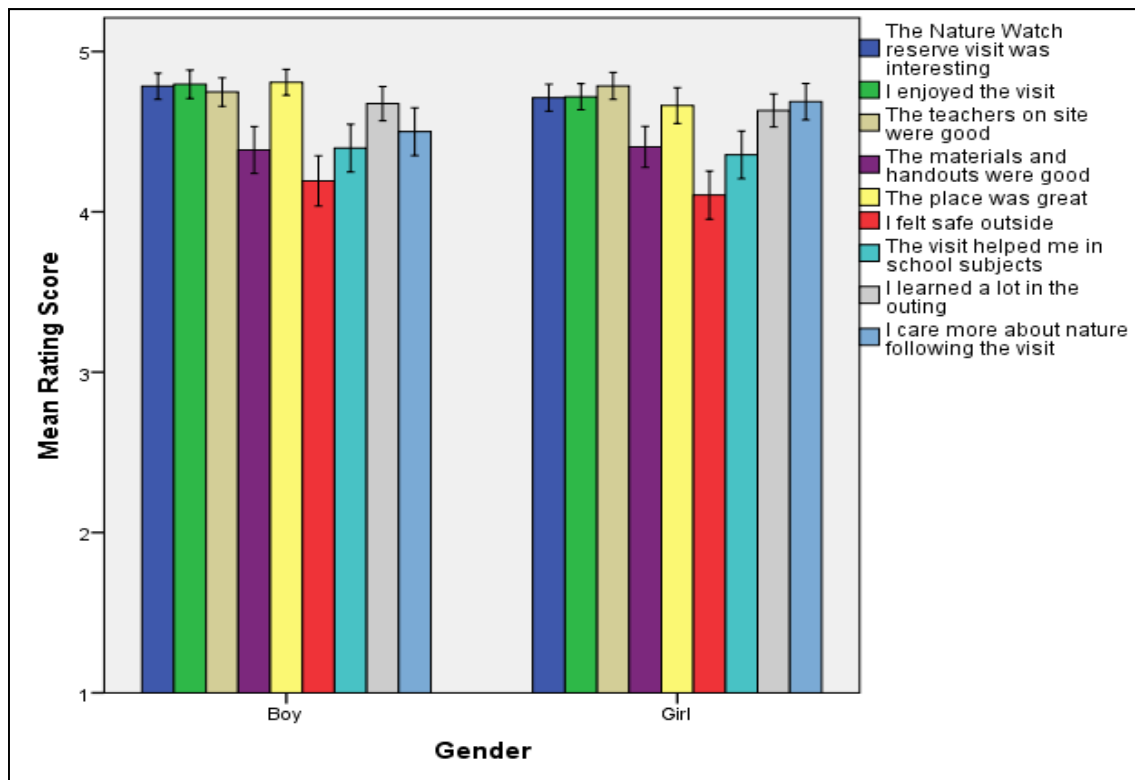


Figure 3. Nature watch reserve visit experience in male/female comparison.

The mean score from the nature watch reserve visit experience was analysed according to the geographic location of the students to identify any correlation between the two. The mean total scores for all the locations

appear to be very positive in all the statements, but there is a sustained greater score for most statements coming from the Gozo region. Further analysis with the Kruskal Wallis test indicates that there is statistical significance for four of the statements: “The materials and handouts were good,” “The visit helped me in school subjects,” “I learnt a lot during the outing,” and “I care more about nature following the visit” since the  $p$ -value (approximately 0.000, 0.000, 0.007, and 0.000, respectively) is less than the 0.05 level of significance. Therefore, the statistical test indicates a statistically significant relationship between geographic location and these four statements (see Table 14 and Figure 4).

Table 14

*Nature Watch Reserve Visit Experience in Location Comparison*

Statements	Location	Mean	Std. deviation	$p$ -value
The nature watch reserve visit was interesting	South	4.78	0.534	0.091
	Central	4.69	0.558	
	North	4.79	0.426	
	Gozo	4.91	0.426	
I enjoyed the visit	South	4.80	0.477	0.072
	Central	4.68	0.651	
	North	4.71	0.469	
	Gozo	4.95	0.213	
The teachers on site were good	South	4.76	0.531	0.106
	Central	4.75	0.617	
	North	4.64	0.633	
	Gozo	5.00	0.000	
The materials and handouts were good	South	4.52	0.797	0.000
	Central	4.19	0.949	
	North	4.57	1.089	
	Gozo	4.82	0.664	
The place was great	South	4.77	0.598	0.811
	Central	4.69	0.700	
	North	4.79	0.426	
	Gozo	4.77	0.528	
I felt safe outside	South	4.22	1.082	0.122
	Central	4.10	0.945	
	North	3.86	0.864	
	Gozo	4.18	0.853	
The visit helped me in school subjects	South	4.48	0.924	0.000
	Central	4.19	1.033	
	North	4.29	0.914	
	Gozo	5.00	0.000	
I learned a lot in the outing	South	4.72	0.594	0.007
	Central	4.55	0.762	
	North	4.50	0.941	
	Gozo	5.00	0.000	
I cared more about nature following the visit	South	4.65	0.746	0.020
	Central	4.54	0.933	
	North	4.14	1.167	
	Gozo	4.82	0.853	

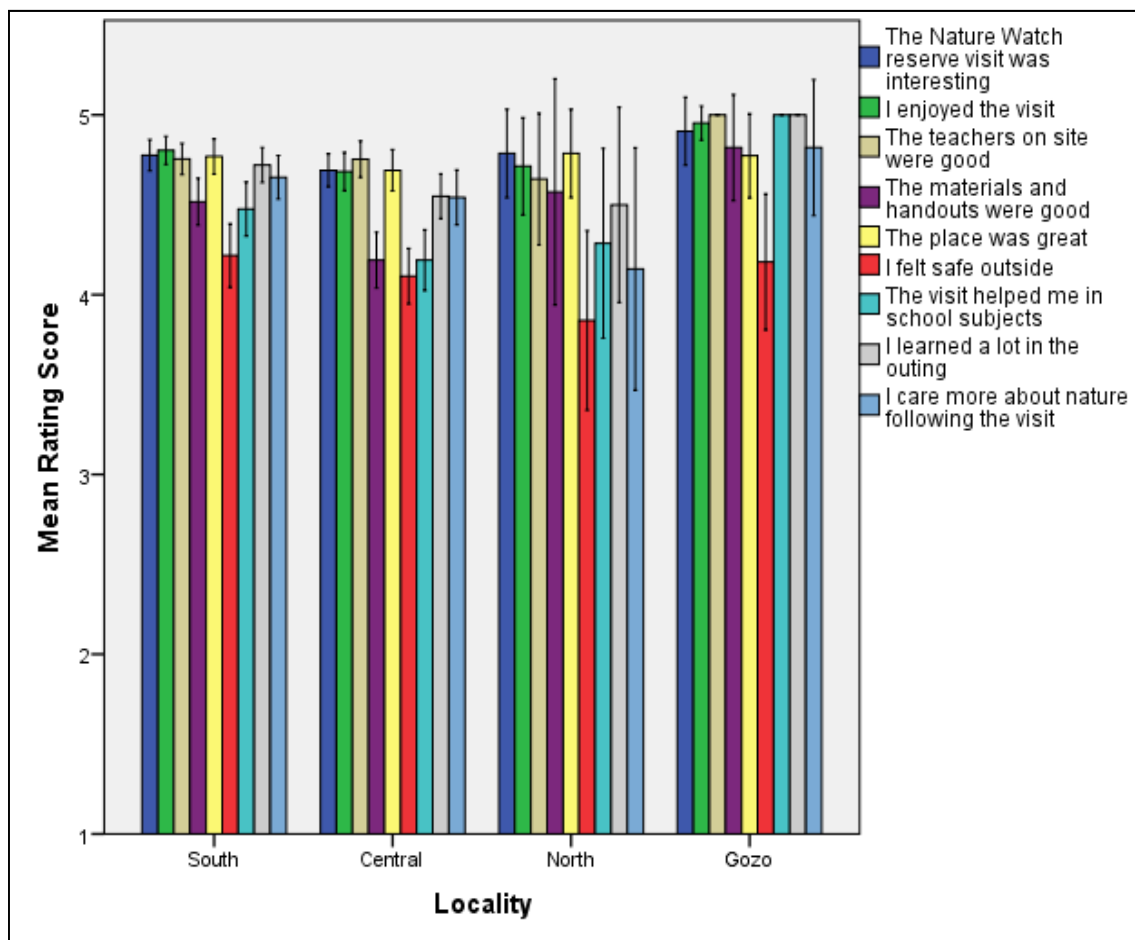


Figure 4. Nature watch reserve visit experience in location comparison.

The analysis of the age of the students to identify any correlation between the two from the nature watch reserve visit experience was same as the results of the geographic location. Both of them appear to be very positive in all the statements, but there is also statistical significance for the four statements. Therefore, the statistical test indicates a statistically significant relationship between age and these four statements (see Table 15 and Figure 5).

### Secondary Students

The results from the questions that concerned the nature watch reserve visit experience for secondary students reveal that the experience was a positive one, although to a lesser extent than for the primary students, and that there are some differences in the results of the various statements. The results for secondary students indicate that “The teachers on site were good (*Mean* = 4.24),” “I felt safe outside (*Mean* = 4.11),” “The nature watch reserve visit was interesting (*Mean* = 4.10)” and “The place was great (*Mean* = 4.10),” were the top scoring statements, while “Group work was good (*Mean* = 3.72),” and “Individual work was good (*Mean* = 3.77)” were the lowest scoring statement. The Friedman test suggests that the difference in statement score is significant and is not attributed to chance since the *p*-value (approximately 0.001) is less than the 0.05 level of significance (see Table 16 and Figure 6).

Table 15

*Nature Watch Reserve Visit Experience in Age comparison*

	Age	Mean	Std. deviation	p-value
The nature watch reserve visit was interesting	7-year-old	4.76	0.578	0.225
	8-year-old	4.75	0.536	
	9-year-old	4.81	0.438	
	10-year-old	4.69	0.471	
	11-year-old	4.56	0.629	
I enjoyed the visit	7-year-old	4.82	0.500	0.064
	8-year-old	4.78	0.498	
	9-year-old	4.76	0.432	
	10-year-old	4.56	0.840	
	11-year-old	4.50	0.816	
The teachers on site were good	7-year-old	4.82	0.632	0.035
	8-year-old	4.71	0.551	
	9-year-old	4.81	0.479	
	10-year-old	4.69	0.471	
	11-year-old	4.75	0.447	
The materials and handouts were good	7-year-old	4.59	0.782	0.000
	8-year-old	4.37	0.919	
	9-year-old	4.50	0.637	
	10-year-old	3.84	1.221	
	11-year-old	3.88	0.885	
The place was great	7-year-old	4.79	0.546	0.527
	8-year-old	4.72	0.673	
	9-year-old	4.74	0.620	
	10-year-old	4.56	0.840	
	11-year-old	4.75	0.577	
I felt safe outside	7-year-old	4.36	1.032	0.000
	8-year-old	4.18	0.934	
	9-year-old	3.96	0.910	
	10-year-old	3.75	1.136	
	11-year-old	3.81	0.834	
The visit helped me in school subjects	7-year-old	4.68	0.635	0.000
	8-year-old	4.29	1.078	
	9-year-old	4.24	1.132	
	10-year-old	3.91	0.928	
	11-year-old	4.06	1.124	
I learned a lot in the outing	7-year-old	4.73	0.658	0.041
	8-year-old	4.68	0.641	
	9-year-old	4.59	0.813	
	10-year-old	4.44	0.716	
	11-year-old	4.56	0.512	
I cared more about nature following the visit	7-year-old	4.64	0.893	0.336
	8-year-old	4.53	0.842	
	9-year-old	4.63	0.896	
	10-year-old	4.56	0.716	
	11-year-old	4.56	1.031	

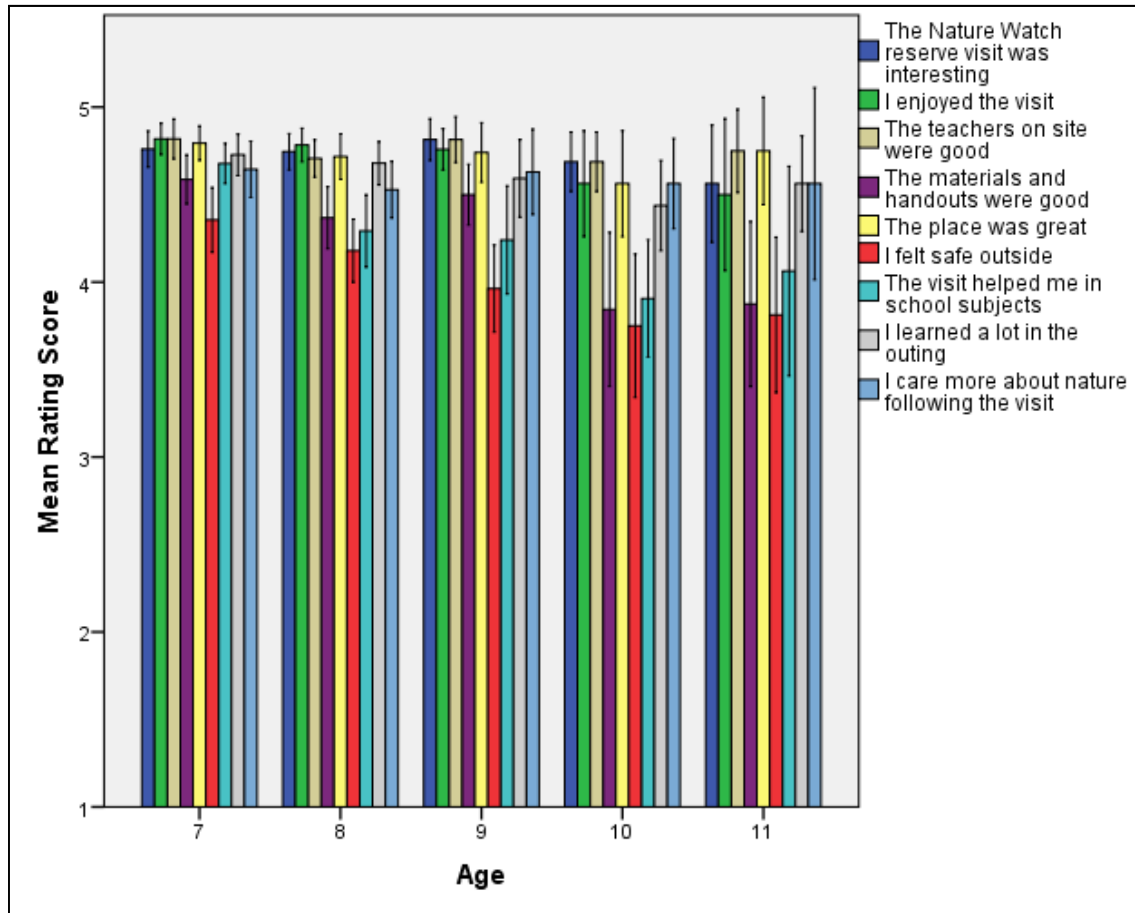


Figure 5. Nature watch reserve visit experience in age comparison.

Table 16

*Nature Watch Reserve Visit Experience for Secondary Students*

Statements	Mean	Std. deviation
The nature watch reserve visit was interesting	4.10	0.853
I enjoyed the reserve visit	3.96	0.911
The teachers on the site were good	4.24	0.795
The materials and handouts were good	4.09	0.854
The place was great	4.10	0.892
I felt safe outside	4.11	0.974
The reserve visit helped me in some school subjects	3.94	0.963
I learnt a lot in the outing	4.00	0.931
Group work was good	3.72	1.041
Individual work was good	3.77	1.023
I cared more about nature following the visit	3.95	1.003

Notes.  $\chi^2(10) = 97.90$ ;  $p < 0.001$ .

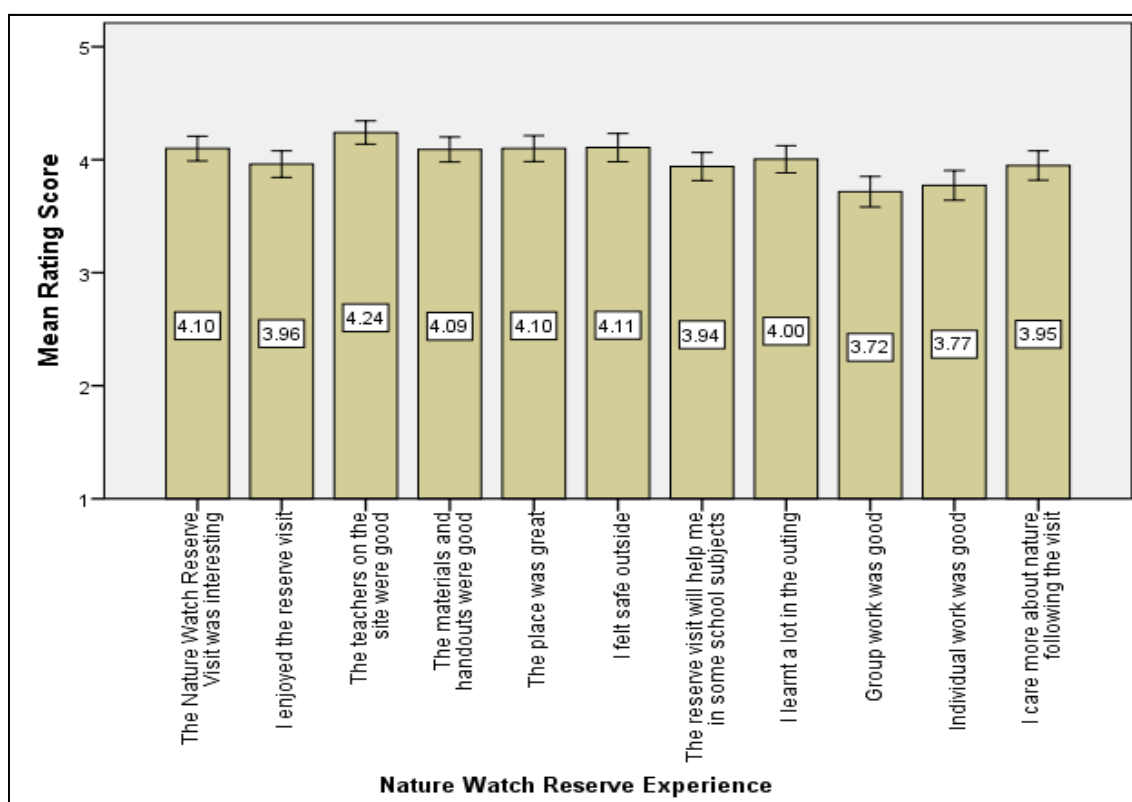


Figure 6. Nature watch reserve visit experience for secondary students.

The mean score from the nature watch reserve visit experience was analysed according to the gender of the young people population to identify any correlation between the two. The mean total scores for females and males appear to be both very positive in all the statements, but in nearly all statements the mean for males is more than the mean for females. Further analysis with the Kruskal Wallis test indicates that for most of the statements there is no statistical significance between genders. However, the test indicates statistical significance for one statement—I enjoyed the visit, since the  $p$ -value (0.034) is less than the 0.05 level of significance. Therefore, the statistical test indicates a statistically significant relationship between gender and this statement, suggesting that males enjoyed the visit more than females. This trend was also statistically significant with the primary school students (see Table 17 and Figure 7).

The mean score from the nature watch reserve visit experience was analysed according to the age of the students to identify any correlation between the two. The mean total scores for all the ages appear to be very positive in all the statements (at a lesser extent than the primary students), but there is an apparent decrease in scores in most of the statements as student age increases. Further analysis with the Kruskal Wallis test indicates that there is statistical significance for eight of the statements: “The nature watch reserve visit was interesting,” “I enjoyed the nature watch reserve visit,” “The teachers on the site were good,” “The materials and handouts were good,” “The place was great,” “The visit will help me in school subjects,” “I learnt a lot during the outing,” and “I cared more about nature following the visit” since the  $p$ -value (approximately 0.000, 0.000, 0.0033, 0.005, 0.003, 0.034, 0.022, and 0.012, respectively) is less than the 0.05 level of significance. Therefore, the statistical test indicates a statistically significant relationship between age and these eight statements. It is clear that younger students are more engaged at a higher level in the outing than older students (see Table 18 and Figure 8).

Table 17

*Nature Watch Reserve Visit Experience in Male/Female Comparison*

Statements	Gender	N	Mean	Std. deviation	p-value
The nature watch reserve visit was interesting	Boy	86	4.23	0.730	0.105
	Girl	147	4.02	0.910	
I enjoyed the reserve visit	Boy	86	4.14	0.754	0.034
	Girl	147	3.86	0.979	
The teachers on the site were good	Boy	86	4.33	0.710	0.305
	Girl	147	4.19	0.839	
The materials and handouts were good	Boy	86	3.99	0.790	0.063
	Girl	147	4.15	0.886	
The place was great	Boy	86	4.23	0.836	0.068
	Girl	147	4.02	0.918	
I felt safe outside	Boy	86	4.15	1.023	0.374
	Girl	147	4.08	0.947	
The visit helped me in some school subjects	Boy	86	4.03	0.939	0.251
	Girl	147	3.88	0.976	
I learnt a lot in the outing	Boy	86	4.05	0.957	0.441
	Girl	147	3.98	0.918	
Group work was good	Boy	86	3.72	1.134	0.754
	Girl	147	3.71	0.986	
Individual work was good	Boy	86	3.94	0.962	0.060
	Girl	147	3.67	1.048	
I cared more about nature following the visit	Boy	86	4.06	1.022	0.131
	Girl	147	3.88	0.990	

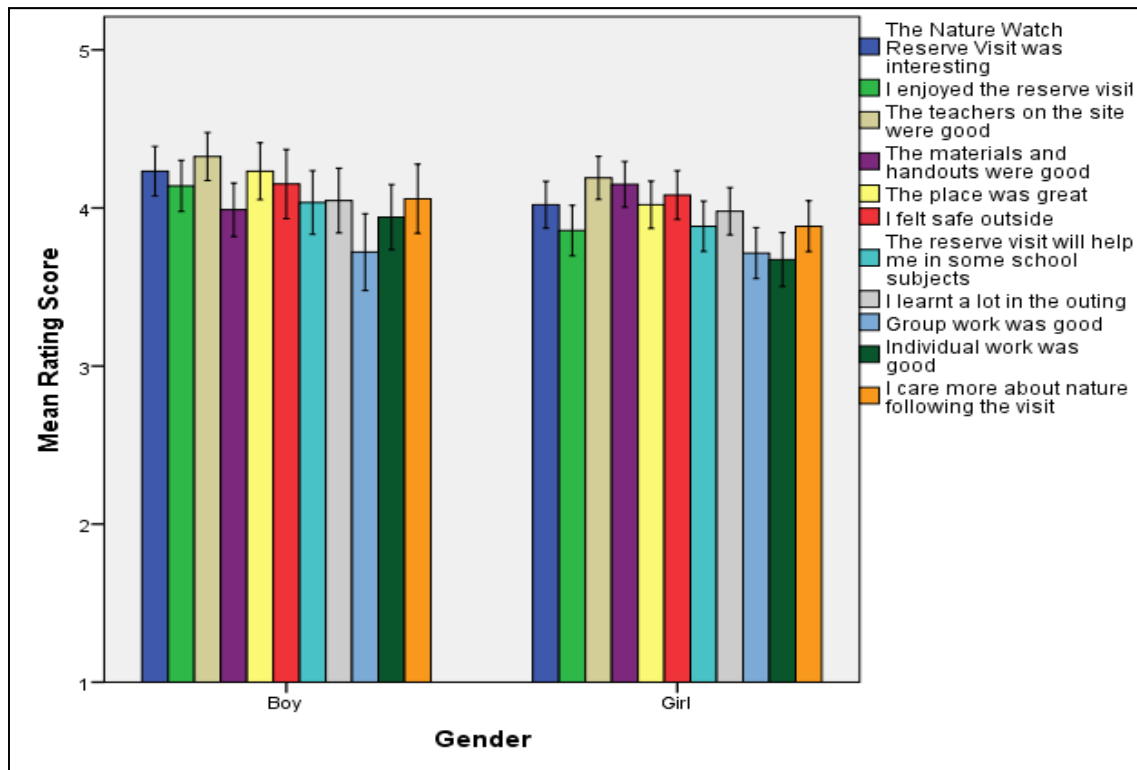


Figure 7. Nature watch reserve visit experience in male/female comparison.



Table 18

*Nature Watch Reserve Visit Experience in Age Comparison*

Statements	Age	N	Mean	Std. deviation	p-value
The nature watch reserve visit was interesting	11-year-old	23	4.74	0.449	0.000
	12-year-old	29	4.38	0.677	
	13-year-old	38	4.13	1.018	
	14-year-old	84	3.98	0.776	
	15- and 16- year-old	59	3.86	0.899	
I enjoyed the reserve visit	11-year-old	23	4.70	0.470	0.000
	12-year-old	29	4.38	0.561	
	13-year-old	38	4.08	1.100	
	14-year-old	84	3.81	0.784	
	15- and 16- year-old	59	3.61	0.983	
The teachers on the site were good	11-year-old	23	4.61	0.583	0.033
	12-year-old	29	4.41	0.628	
	13-year-old	38	4.26	0.860	
	14-year-old	84	4.07	0.847	
	15- and 16- year-old	59	4.24	0.773	
The materials and handouts were good	11-year-old	23	4.65	0.487	0.005
	12-year-old	29	4.10	0.724	
	13-year-old	38	3.84	0.973	
	14-year-old	84	4.04	0.842	
	15- and 16- year-old	59	4.10	0.885	
The place was great	11-year-old	23	4.52	0.846	0.003
	12-year-old	29	4.31	0.604	
	13-year-old	38	4.16	1.027	
	14-year-old	84	4.05	0.890	
	15- and 16- year-old	59	3.86	0.880	
I felt safe outside	11-year-old	23	4.43	0.590	0.114
	12-year-old	29	4.41	0.733	
	13-year-old	38	4.03	1.262	
	14-year-old	84	3.95	0.968	
	15- and 16- year-old	59	4.10	0.959	
The visit helped me in some school subjects	11-year-old	23	4.52	0.665	0.034
	12-year-old	29	3.79	1.048	
	13-year-old	38	3.82	1.205	
	14-year-old	84	3.88	0.884	
	15- and 16- year-old	59	3.95	0.899	
I learnt a lot in the outing	11-year-old	23	4.48	0.665	0.022
	12-year-old	29	4.24	0.951	
	13-year-old	38	3.92	1.124	
	14-year-old	84	3.88	0.937	
	15- and 16- year-old	59	3.93	0.807	
Group work was good	11-year-old	23	4.13	0.920	0.126
	12-year-old	29	3.55	1.298	
	13-year-old	38	3.89	0.981	
	14-year-old	84	3.65	0.963	
	15- and 16- year-old	59	3.61	1.067	

(Table 18 to be continued)

	11-year-old	23	3.91	1.041	
	12-year-old	29	3.76	0.872	
Individual work was good	13-year-old	38	3.68	1.188	0.831
	14-year-old	84	3.69	1.053	
	15- and 16- year-old	59	3.90	0.941	
	11-year-old	23	4.48	0.665	
	12-year-old	29	4.10	0.900	
I cared more about nature following the visit	13-year-old	38	4.03	1.078	0.012
	14-year-old	84	3.86	1.110	
	15- and 16- year-old	59	3.75	0.883	

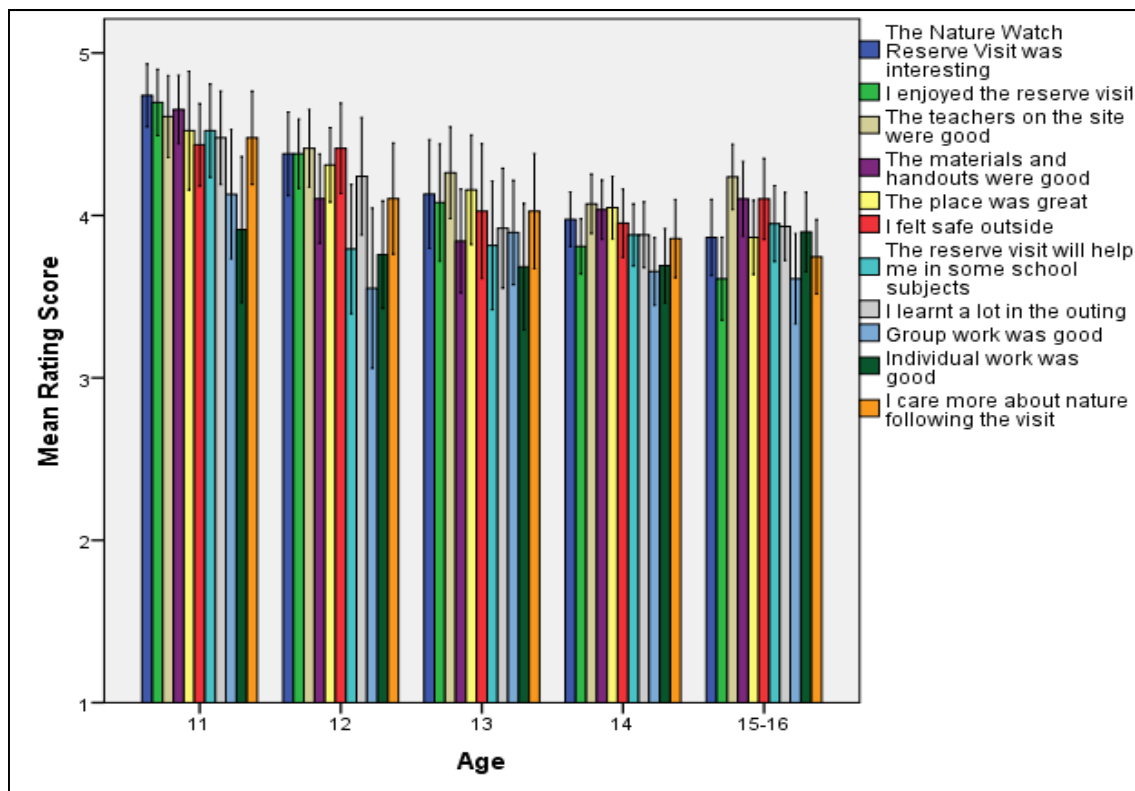


Figure 8. Nature watch reserve visit experience in age comparison.

The mean score from the nature watch reserve visit experience was analysed according to the geographic location of the students to identify any correlation between the two. The mean total scores for all the locations appear to be very positive in all the statements, but there is a sustained greater score for most statements coming from the Gozo region and a sustained low score for most statements from the Northern region. Further analysis with the Kruskal Wallis test indicates that there is statistical significance for seven statements: “The nature watch reserve visit was interesting,” “I enjoyed the reserve visit,” “The teachers on the site were good,” “The place was great,” “I learnt a lot during the outing,” “Group work was good,” and “I care more about nature following the visit” since the  $p$ -value (approximately 0.005, 0.004, 0.028, 0.017, 0.028, 0.002, and 0.035, respectively) is less than the 0.05 level of significance. Therefore, the statistical test indicates a statistically significant relationship between geographic location and these seven statements (see Table 19 and Figure 9).

Table 19

*Nature Watch Reserve Visit Experience in Locality Comparison*

Statements	Locality	N	Mean	Std. deviation	p-value
The nature watch reserve visit was interesting	South	105	4.17	0.904	0.005
	Central	76	3.92	0.845	
	North	18	3.83	0.857	
	Gozo	24	4.46	0.509	
I enjoyed the reserve visit	South	105	4.06	0.959	0.004
	Central	76	3.72	0.961	
	North	18	3.78	0.808	
	Gozo	24	4.38	0.495	
The teachers on the site were good	South	105	4.25	0.818	0.028
	Central	76	4.16	0.834	
	North	18	3.94	0.725	
	Gozo	24	4.58	0.584	
The materials and handouts were good	South	105	4.10	0.876	0.215
	Central	76	4.14	0.860	
	North	18	3.72	0.826	
	Gozo	24	4.21	0.721	
The place was great	South	105	4.10	1.005	0.017
	Central	76	4.04	0.824	
	North	18	3.83	0.857	
	Gozo	24	4.54	0.509	
I felt safe outside	South	105	4.08	1.016	0.482
	Central	76	4.13	0.998	
	North	18	3.83	1.043	
	Gozo	24	4.29	0.806	
The visit helped me in some school subjects	South	105	3.93	1.103	0.151
	Central	76	3.91	0.836	
	North	18	3.72	0.826	
	Gozo	24	4.29	0.806	
I learnt a lot in the outing	South	105	4.05	1.013	0.028
	Central	76	3.86	0.875	
	North	18	3.94	0.938	
	Gozo	24	4.46	0.658	
Group work was good	South	105	3.62	1.121	0.002
	Central	76	3.79	0.957	
	North	18	3.17	0.924	
	Gozo	24	4.29	0.690	
Individual work was good	South	105	3.71	1.107	0.114
	Central	76	3.70	0.966	
	North	18	3.67	1.138	
	Gozo	24	4.25	0.737	
I care more about nature following the visit	South	105	4.04	0.970	0.035
	Central	76	3.79	1.011	
	North	18	3.56	1.247	
	Gozo	24	4.33	0.868	

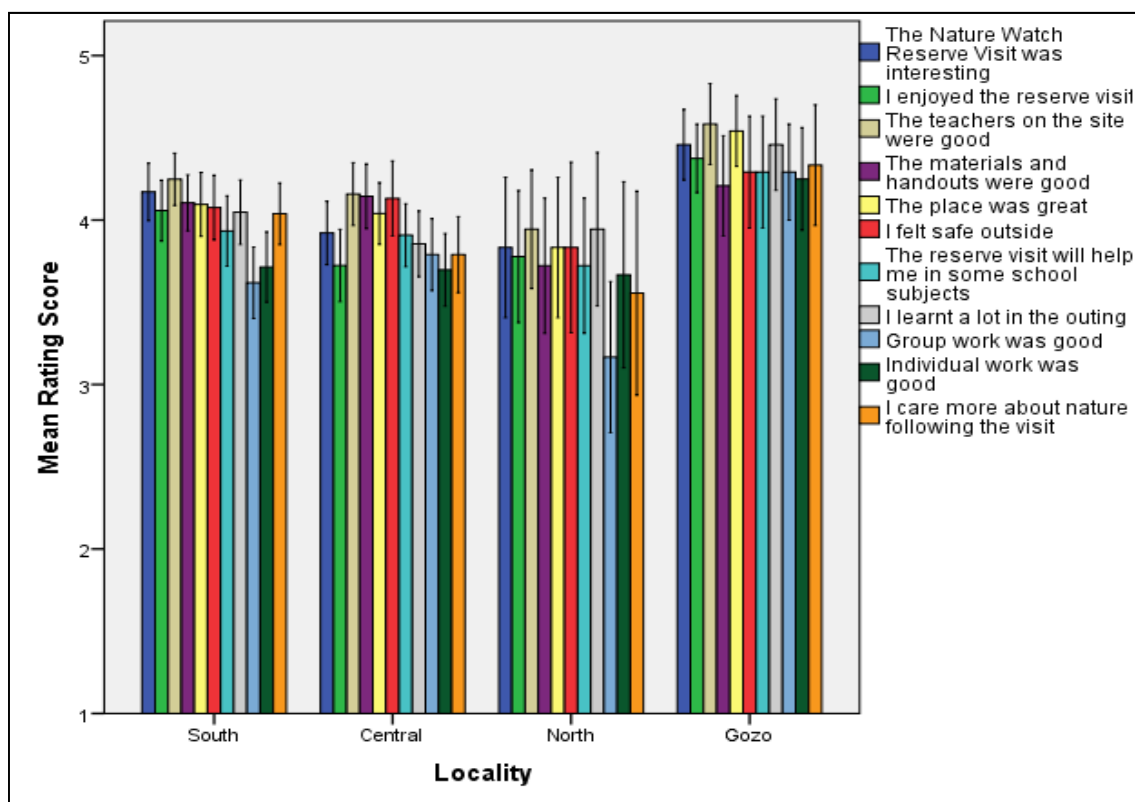


Figure 9. Nature watch reserve visit experience in locality comparison.

“I increase my knowledge (77.8% for boys and 69.5% for girls)” and “I care about the environment (54.3% for boys and 59.6% for girls)” were mentioned as the most important reasons for taking part in the Nature Reserve visit. There are significant differences to the statement “To make more friends (3.7% for boys and 9.2% for girls).” Girls appear to afford more importance to the collective social aspect than boys. Moreover, an important aspect for boys appears to be the fun factor with 53.1% choosing the statement “I have fun” when compared to 36.2% for girls.

The remaining statements have very comparable results from both boys and girls and generally have very low reply rates. These include statements that involved some sort of achievement or competition, such as “I like to receive an award (6.2% for boys and 8.5% for girls).” Another low scoring statement includes “Because of my values (6.2% for boys and 7.8% for girls),” which contrasts with the other value statement involved “Because I care for the environment (54.3% for boys and 59.6% for girls),” possibly indicating lack of proper understanding of the more abstract terms like values (see Table 20 and Figure 10).

Table 20

*The Best Part of the Programme in Male/Female Comparison*

Statements		Gender	
		Boy	Girl
I like to receive an award	Count	5	12
	Percentage (%)	6.2	8.5
I increase my knowledge	Count	63	98
	Percentage (%)	77.8	69.5

(Table 20 to be continued)

Because of my values	Count	5	11
	Percentage (%)	6.2	7.8
To do better in school subjects	Count	29	59
	Percentage (%)	35.8	41.8
I care about the environment	Count	44	84
	Percentage (%)	54.3	59.6
I love the activities	Count	23	40
	Percentage (%)	28.4	28.4
I have fun	Count	43	51
	Percentage (%)	53.1	36.2
To make more friends	Count	3	13
	Percentage (%)	3.7	9.2
To achieve more as a class	Count	9	32
	Percentage (%)	11.1	22.7
To achieve more as a school	Count	14	18
	Percentage (%)	17.3	12.8

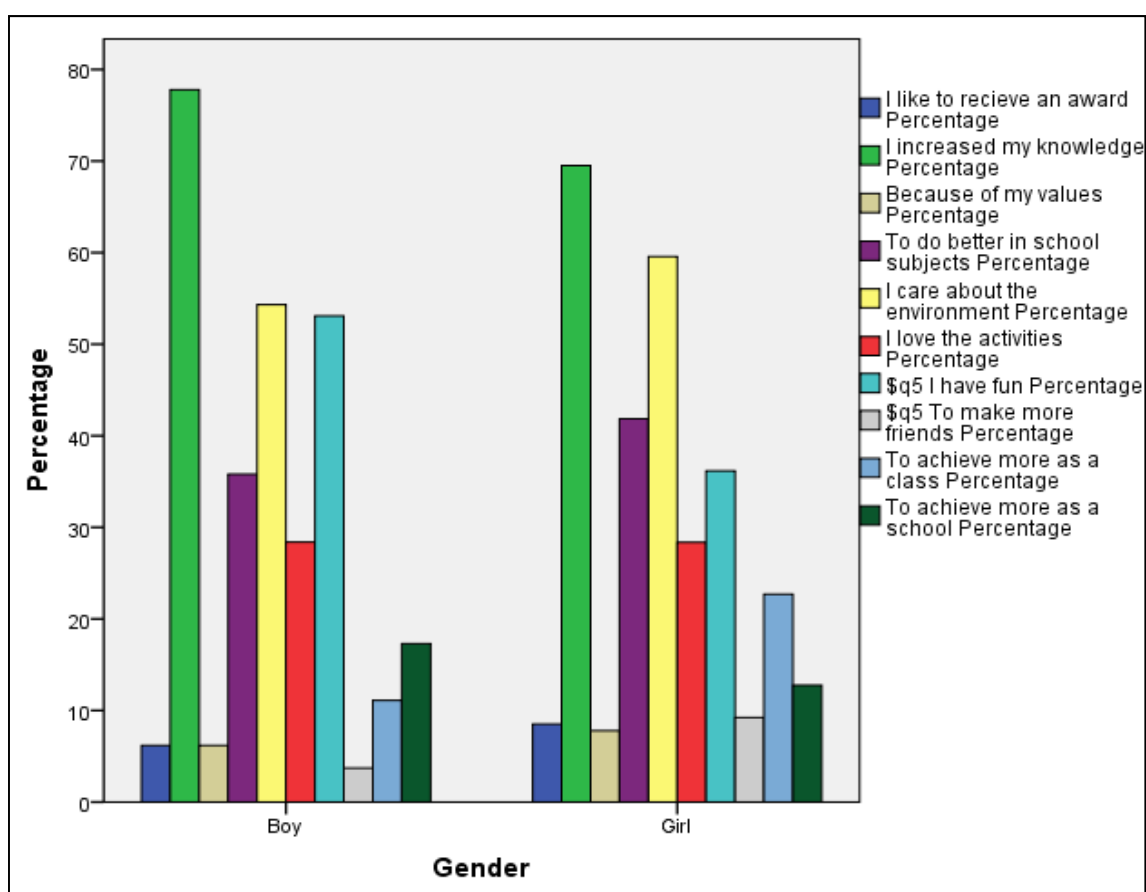


Figure 10. Nature watch reserve visit experience in male/female comparison.

### Conclusions and Recommendations

The programme appears to be having a positive effect on students and is definitely a worthwhile experience for all the participants involved. Additionally, it is clearly having an effect on both environmental

knowledge and environmental attitudes to a different extent. A number of recommendations can be found throughout the text of this report when the results are focused on a particular issue and warrant such a response. The following are general recommendations for the further improvement of the programme:

1. Ensuring that the potential of this activity to become a significant life experience is achieved through better streamlining of the activities according to age, locality, and gender;
2. One day is not enough. Either increase the number of outings or even better consider spreading the outing on two days;
3. Increase curricular links with more varied topics especially for secondary students;
4. Improved logistics to cater for younger students;
5. More physical resources to be divided by fewer students;
6. Increase links between the natural world, the social world, and the economic one in the experience as a whole;
7. Increase the variety of activities to cater for different interests. A special focus on games especially with the younger students and an increased focus on hands on activities;
8. Ongoing monitoring and data collection to be fed to the programme in an effort to continuously improve in a dynamic world.

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